

AMENDMENTS TO THE CLAIMS

Claim 1 (Withdrawn) A polishing tool for polishing an object, wherein the polishing tool is comprised primarily by a thermoplastic resin.

Claim 2 (Withdrawn) A polishing tool according to claim 1, wherein the polishing tool is a fixed-abrasive polishing tool that contains abrading particles within the tool.

Claim 3 (Withdrawn) A polishing tool according to claim 1, wherein the polishing tool is a non-fixed-abrasive polishing pad.

Claim 4 (Withdrawn) A polishing tool according to claim 2, wherein the abrading particles include cerium oxide (CeO_2), alumina (Al_2O_3), silicon carbide (SiC), silicon dioxide (SiO_2), zirconia (ZrO_2), iron oxides ($\text{FeO}, \text{Fe}_3\text{O}_4$), manganese oxide ($\text{MnO}_2, \text{Mn}_2\text{O}_3$), magnesium oxide (MgO), calcium oxide (CaO), barium oxide (BaO), zinc oxide (ZnO), barium carbonate (BaCO_3), calcium carbonate (CaCO_3), diamond (C), or a composite material comprised by those recited above.

Claim 5 (Withdrawn) A polishing tool according to claim 1, wherein the polishing tool is formed by injection molding to charge a feed material under pressure into a mold of a specific shape.

Claim 6 (Withdrawn) A polishing tool according to claim 1, wherein a material comprising the polishing tool further comprises an interface activation agent.

Claim 7 (Withdrawn) A polishing tool according to claim 1, wherein a material comprising the polishing tool further comprises a hydrophilic substance or said material is modified by adding the hydrophilic substance.

Claim 8 (Withdrawn) A fixed-abrasive polishing tool for polishing an object, said polishing tool comprising:

abrading particles; and

a resin for binding said abrading particles in a matrix of said resin, wherein said resin comprises thermoplastic resin.

Claim 9 (Withdrawn) A fixed-abrasive polishing tool according to claim 8, wherein the abrading particles include cerium oxide (CeO_2), alumina (Al_2O_3), silicon carbide (SiC), silicon dioxide (SiO_2), zirconia (ZrO_2), iron oxides (FeO , Fe_3O_4), manganese oxide (MnO_2 , Mn_2O_3), magnesium oxide (MgO), calcium oxide (CaO), barium oxide (BaO), zinc oxide (ZnO), barium carbonate (BaCO_3), calcium carbonate (CaCO_3), diamond (C), or a composite material comprised by those recited above.

Claim 10 (Withdrawn) A fixed-abrasive polishing tool according to claim 8, wherein a porosity is formed in said polishing tool.

Claim 11 (Withdrawn) A fixed-abrasive polishing tool according to claim 10, wherein a range of composition of fixed-abrasives (percentages of abrading particles (Vg), binder (Vb) and air porosity (Vp)) in volume percent (vol%) are: $10\% < \text{abrading particles (Vg)} < 50\%$, $30\% < \text{binder (Vb)} < 80\%$, and $0\% < \text{air porosity (Vp)} < 40\%$.

Claims 12-37 (Cancel)

Claim 38 (Withdrawn) A polishing apparatus for polishing a semiconductor wafer, comprising:
a topring for holding the wafer; and
a polishing tool, said polishing tool comprised primarily by a thermoplastic resin.

Claim 39 (Withdrawn) A polishing apparatus according to claim 38, wherein said semiconductor wafer has patterns comprised by high portions and low portions.

Claim 40 (Withdrawn) A polishing apparatus for polishing a semiconductor wafer, comprising:

a topring for holding the wafer; and

a fixed-abrasive polishing tool, said polishing tool comprising abrading particles and a resin for binding said abrading particles in a matrix of said resin, said resin comprises thermoplastic resin.

Claim 41 (Withdrawn) A polishing apparatus according to claim 40, wherein a range of composition of fixed-abrasive polishing tool (percentages of abrading particles (Vg), binder (Vb) and air porosity (Vp)) in volume percent (vol%) are: 10 % < abrading particles (Vg) < 50 %, 30 % < binder (Vb) < 80 %, and 0 % < air porosity (Vp) < 40 %.

Claim 42 (Withdrawn) A polishing apparatus according to claim 40, wherein said semiconductor wafer has patterns comprised by high portions and low portions.

Claim 43 (Withdrawn) A polishing apparatus according to claim 40, further comprising: a dresser for dressing a polishing surface of said fixed-abrasive polishing tool.

Claim 44 (Withdrawn) A polishing apparatus according to claim 40, wherein said fixed-abrasive polishing tool is mounted on a base.

Claim 45 (Withdrawn) A polishing apparatus according to claim 44, wherein a polishing tool comprised by said fixed-abrasive polishing tool and said base is mounted detachably on a polishing table.

Claim 46 (Withdrawn) A polishing apparatus according to claim 45, wherein said polishing tool is fixed to said polishing table by clamps.

Claim 47 (Withdrawn) A polishing apparatus for polishing a semiconductor wafer, comprising:
at least one topring for holding the wafer; and

at least two polishing tables providing polishing surfaces respectively, wherein one of said polishing table having a fixed-abrasive polishing tool, said polishing tool comprising abrading particles and a thermoplastic resin for binding said abrading particles.

Claim 48 (Withdrawn) A method of polishing a substrate comprising:
polishing the substrate firstly by a fixed-abrasive polishing tool, said polishing tool comprising abrading particles and a thermoplastic resin for binding said abrading particles; and
finishing the substrate secondly by a finishing pad.

Claim 49 (Withdrawn) A method according to claim 48, wherein said first polishing is performed by supplying liquid not containing abrading particles.

Claim 50 (Withdrawn) A method according to claim 48, wherein said first polishing is performed by supplying water containing additive agent.

Claim 51 (Withdrawn) A method according to claim 48, wherein said finishing step is performed by supplying water.

Claim 52 (New) A method for manufacturing a fixed-abrasive polishing tool comprising:
mixing abrading particles and a resin in a liquid;
drying said mixed abrading particles and resin to obtain mixed powders;
filling said mixed powders into a mold; and
heating and pressing said mixed powders in said mold so as to control porosity of said fixed-abrasive polishing tool in a certain range.

Claim 53 (New) A method according to claim 52, wherein said drying comprises a mist drying step.

Claim 54 (New) A method according to claim 53, wherein said mist drying step comprises a spray drying step.

Claim 55 (New) A method according to claim 52, wherein said mixed powders are in a diameter of a range of 1~500 μ m.

Claim 56 (New) A method according to claim 52, wherein said abrading particles are provided in a slurry state.

Claim 57 (New) A method according to claim 52, wherein said resin is provided in a liquid state where said resin is dispersed or dissolved in a water or a solvent.

Claim 58 (New) A method according to claim 52, wherein said liquid comprises water or a solvent.

Claim 59 (New) A method according to claim 52, further comprising at least one additive of a surface-active agent, a polishing promoter, and an elastic material being added during said mixing.

Claim 60 (New) A method according to claim 52, wherein said porosity is controlled to 0-20% in volumetric composition of the fixed-abrasive polishing tool.

Claim 61 (New) A method according to claim 52, wherein said porosity is controlled to 5-15% in volumetric composition of the fixed-abrasive polishing tool.

Claim 62 (New) A method according to claim 52, wherein said mixed powders are pressed with less pressure firstly, and then pressed with more pressure during said pressing in the mold.

Claim 63 (New) A method for manufacturing a fixed-abrasive polishing tool comprising:

mixing abrading particles and a raw material of a resin in a liquid;
polymerizing the resin during said mixing;
drying said mixed abrading particles and polymerized resin to obtain mixed powders;
filling said mixed powders into a mold;
heating and pressing said mixed powders in said mold so as to control porosity of said fixed-abrasive polishing tool in a certain range.

Claim 64 (New) A method according to claim 63, wherein said drying comprises a mist drying step.

Claim 65 (New) A method according to claim 64, wherein said mist drying step comprises a spray drying step.

Claim 66 (New) A method according to claim 63, wherein said mixed powders are in a diameter of a range of 1~500 μ m.

Claim 67 (New) A method according to claim 63, wherein said abrading particles are provided in a slurry state.

Claim 68 (New) A method according to claim 63, wherein said liquid comprises water or a solvent.

Claim 69 (New) A method according to claim 63, further comprising additives such as surface-active agent, polishing promoter, or elastic material being added during said mixing.

Claim 70 (New) A method according to claim 63, wherein said porosity is controlled to 0-20% in volumetric composition of the fixed-abrasive polishing tool.

Claim 71 (New) A method according to claim 63, wherein said porosity is controlled to 5-15% in volumetric composition of the fixed-abrasive polishing tool.

Claim 72 (New) A method according to claim 63, wherein said mixed powders are pressed with less pressure firstly, and then pressed with more pressure during said pressing in the mold.